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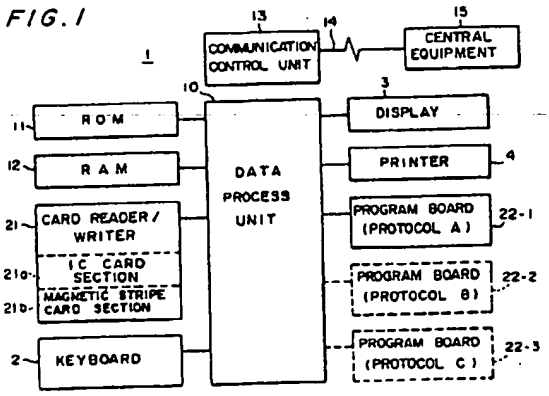
(54) Card transactions processing apparatus, program board for use with such apparatus and method to use such apparatus or board.

(57) A card transactions processing apparatus executes, when a card storing data is mounted thereon, predetermined transaction processing by using the card data. The processing apparatus has a card reader/writer (21) for selectively reading the card data out of the card and writing data in the card, a data processing unit (10) for executing predetermined processing on the basis of the card data, a program board mounting section (72) for removably mounting a program board (22) that stores a program particular to a party associated with the card.

FIG. 1



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CARD TRANSACTIONS PROCESSING APPARATUS, PROGRAM BOARD FOR USE WITH SUCH APPARATUS AND METHOD TO USE SUCH APPARATUS OR BOARD

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a card transactions processing apparatus and, more particularly, to a card transactions processing apparatus advantageously applicable to IC cards and magnetic stripe cards for executing various kinds of transactions processing, the program board for use with such apparatus and the method to use such apparatus or board.

Description of the Prior Art

With the spread of various kinds of credit cards, a card transactions processing apparatus implementing card-based transactions is extensively used. This kind of apparatus is in many cases connected in an on-line configuration to central equipment which collectively supervises transactions data associated with the apparatus.

The card transactions processing apparatus has a card reader/writer for selectively reading data out of an IC card or a magnetic stripe card and writing data in such a card. The processing apparatus also has keys which are accessible for entering a particular kind of transaction such as proceeds, preapproval or comparison, and a particular processing division such as debit (price of purchase being immediately charged to deposite account) or chock.

For a transaction using a card, an attendant authorized to operate the processing apparatus loads the card reader/writer with a customer's credit card and then manipulates the keys to enter the kind of transaction and the division of processing. In the case of credit processing, for example, the attendant sequentially enters an installment plan including the number of installments and the amount of each installment on the keys by a predetermined sequence.

In general, credit cards are issued not only in the form of IC cards but also in the form of magnetic stripe cards. A problem with a prior art card transactions processing apparatus is that, if the apparatus is designed for use with IC cards, it cannot settle transactions associated with magnetic stripe cards. Specifically, a magnetic stripe card cannot be dealt with unless an exclusive card processing apparatus for such a card is kept at hand in addition to the processing apparatus which is operable with IC cards.

Furthermore, with the prior art processing apparatus, it is necessary to store processing programs and data each being associated with a different card issuing firm in data storing areas of IC cards. This critically limits the freely usable area available in an IC card. More specifically, the prior art processing apparatus cannot meet the increasing demand for standardization which would allow an IC card to be used not only for particular transaction processing associated with a particular party but also for other various purposes.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a card transactions processing apparatus which, even with an IC card that does not store a credit transaction or similar transaction program or data, can execute such transaction processing and is operable even with a magnetic stripe card.

In accordance with the present invention, a card transactions processing apparatus for executing, when a card storing data is mounted on the apparatus, predetermined processing by using card data being stored in the card comprises a card reader/writer for selectively reading the card data out of the card and writing data in the card, data processing unit for executing predetermined processing on the basis of the card data, and program board mounting section for removably mounting a program board which stores a processing program particular to a party associated with the card.

Also, in accordance with the present invention, a card transactions processing apparatus for executing, when a card storing data is mounted on the apparatus, predetermined processing by using card data being stored in the card comprises a card reader/writer for selectively reading the card data out of the card and writing data in the card, data processing unit for executing predetermined processing on the basis of the card data, and program board means on which at least one program board storing a processing program particular to a party may be mounted.

Further, in accordance with the present invention, a program board comprises a connector for connecting to a card transactions processing apparatus which executes transaction processing by using card data being stored in a card, a memory section loaded with a transaction program and data, and a control section for controlling the interchange of data of the program board with the card

transaction processing apparatus on the basis of the transaction program and data being stored in the memory section.

In accordance with the present invention, a card transactions processing apparatus has a card reader/writer for reading and writing data in a card, and a program board storing a transaction program and data particular to a card issuing firm. It is not necessary, therefore, to load the data storing area of each IC card with such a processing program and data. When a transaction processing request associated with a card occurs, processing is executed on the basis of the transaction program and data being stored in the program board. A change in processing program is readily coped with by the replacement of the program board.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects and features of the present invention will become more apparent from the consideration of the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic block diagram showing a card transactions processing apparatus embodying the present invention;

FIG. 2 is an perspective view showing specific appearance of the processing apparatus shown in FIG. 1;

FIG. 3 is a plan view of a keyboard included in the processing apparatus of FIG. 2, showing a specific arrangement of keys on the keyboard;

FIG. 4 is perspective view showing specific appearance of a board mounting section which is defined in a bottom portion of the processing apparatus shown in FIG. 2;

FIG. 5 is a perspective view showing a specific construction of a program board applicable to the arrangement of FIG. 1;

FIG. 6 schematically shows memories which are installed in the program board of FIG. 5;

FIG. 7 is a flowchart demonstrating access processing associated with the program board;

FIG. 8 is a memory map representative of a specific memory arrangement of the program board shown in FIG. 5;

FIG. 9 indicates a specific format of an answer-to-reset signal; and

FIGS. 10A, 10B and 10C are flowcharts demonstrating specific operations of the processing apparatus shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 2 of the drawings, a card transactions processing apparatus embodying the present invention is shown and generally designated by the reference numeral 1. As shown, the apparatus 1 is generally made up of a keyboard 2, a display 3, a printer 4, a card reader/writer 21, and a pin pad 6. A program board, not shown, may be removably connected to the apparatus 1, as described in detail later.

The keyboard 2 is mounted on the upper surface of a front part of the processing apparatus 1 and has a plurality of keys arranged thereon. Advantageously implemented by a liquid crystal display, for example, the display 3 shows operation guides for the manipulations of the apparatus and data entered on the keyboard 2, as needed. The printer 4 may be implemented as a thermal printer, for example, and is operable to print transaction data in the form of a slip or similar recording. The card reader/writer 21 reads data or writes data in an IC card, magnetic stripe card or similar card usable with the apparatus 1. The pin pad 6 serves as an operation unit for entering various kinds of data such as a code to be assigned to an individual. The pin pad 6 is operatively connected to the apparatus 1 by a cable 6a.

FIG. 3 illustrates a specific arrangement of keys on the keyboard 2 of the card transactions processing apparatus 1. The keyboard 2 is shown as comprising a numeral key section 2a having so-called ten keys, and a command key section 2b which are accessible for entering various kinds of commands. An attendant authorized to operate the apparatus 1 is capable of entering any desired data and select a particular kind of transaction, a particular division of processing and so forth on the keyboard 2.

Referring to FIG. 1, the card transactions processing apparatus 1 is schematically shown in a block diagram. As shown, the apparatus 1 has a data processing unit 10 for controlling various kinds of transactions processing which are available with the apparatus 1. Connected to the data processing unit 10 are a read only memory (ROM) 11, a random access memory (RAM) 12, a communication control unit 13, and a program board 22 as well as the keyboard 2, display 3, printer 4, and card reader/writer 21. The communication control unit 13 is connected to a central station or equipment 15 by a communication line 14.

The data processing unit 10 plays the role of a control circuit for supervising the operations of the entire processing apparatus 1. The ROM 11 is a storage which is loaded with programs and data for executing many kinds of transactions processing. The RAM 12 is a temporary storage in which transactions data or similar data may be stored for a moment. The communication control unit, com-

munication control circuit, 13 controls the interchange of data between the processing apparatus 1 and the central equipment 15.

As shown in FIG. 1, the card reader/writer 21 is constituted by an IC card section 21a and a magnetic stripe card section 21b. The IC card section 21a and the magnetic stripe card section 21b write data in and read data out of an IC card and a magnetic stripe card, respectively. Specifically, the IC card section 21a is implemented as a circuit capable of making contact with a terminal of an IC card to thereby read and write data in the IC card via the terminal. The magnetic stripe card section 21b is configured as a circuit having a magnetic head which senses magnetic stripes that are provided on a magnetic card.

The program board 22 stores processing programs and data which are associated with IC cards and magnetic stripe cards. The program board 22 also stores protocol data representative of transmission and reception for implementing the communication between the processing apparatus 1 and the central equipment 15, the protocol data being unique to a particular firm which issues cards. In the illustrative embodiment, the processing apparatus 1 is adaptive to three different kinds of protocols, i. e., protocols A, B an C particular to card issuing firms A, B and C, respectively. Specifically, the program board 22 is implemented as a program board 22-1 which is assigned to a protocol A, and extra program boards 22-2 and 22-3 which are assigned to protocols B and C, respectively. 'The data processing unit 10 is provided with a plurality of connectors 74 (FIG. 4) so that the apparatus 1 is operable with extra program boards 22 such as the program boards 22-2 and 22-3, as needed.

FIG. 4 is a perspective view of the card transactions processing apparatus 1 positioned upside down and indicates how the program board 22 may be mounted on the apparatus 1. In the illustrative embodiment, the processing apparatus 1 has on its bottom a program board mounting section 72 which is configured to accommodate extra program boards 22 or to facilitate replacement of program boards 22. As shown, the program board mounting section 72 is located in a bottom front part of the processing apparatus 1 and is usually protected by a cover 70 against impurities. To connect an extra program board 22 or to replace a program board 22 with another, one turns over the processing apparatus 1 and then removes the cover 70 from the bottom of the apparatus 1. In this condition, the program board mounting section 72 is uncovered and, therefore, readily accessible for inserting a program board 22 in an unoccupied predetermined connector 74. While six connectors 74 are shown in FIG. 4, the processing apparatus 1 may of course be provided with more than six or less than six such connectors, as desired.

Referring to FIG. 5, the program board 22 has a connector 23 formed at one end thereof. The connector 23 is provided with a plurality of terminals thereon and has thereinside a control section 22a and a memory 22b. Having a male configuration, the connector 22a is capable of mating with any of the connectors 74 (FIG. 4) of the board mounting section 72 which are electrically connected to the data processing unit 10 (FIG. 1).

The control section 22a controls the interchange of data which the program board 22 may perform with the data processing unit 10 on the basis of a transactions program and data being stored in the memory 22b. The control adopts a procedure which insures security as with an ordinary IC card. For example, the memory 22b of the program board 22 may be loaded with a memory lock and a file lock or file locks, while the data processing unit 10 may be provided with keys each being associated with respective one of the memory lock and file locks. With this lock-and-key scheme, the data processing section 10 is allowed to access the memory 22b by using the keys, as described in detail later. Stated another way, the data processing section 10 cannot reference data stored in the memory 22b unless it is provided with such keys.

FIG. 6 schematically shows a specific construction of the memory 22b which is incorporated in the program board 22. As shown, the memory 22b is composed of a memory 60 with a lock and a memory 61 without a lock. The memory or lock memory 60 has a memory lock 62 for governing the access to the entire memory 60 and may be opened by an exclusive key 70. A plurality of files, η files, may be defined in the lock memory 60 as represented by two files 60a and 60b in the figure. The files 60a and 60b are provided with file locks 63 and 64, respectively, and may be opened by exclusive keys 71 and 72, respectively. This is true with all the other files which may be defined in the lock memory 60. Each of the memory lock 62 and file locks 63 and 64 can be opened only when the key, or a kind of password, 70, 71 or 72 applied thereto is coincident with the lock.

To access the file 60a, for example, the memory lock 62 is opened by using the key 70, and then the file lock 63 associated with the file 60a is opened by using the key 71. A reference will be made to FIG. 7 for describing a specific procedure for accessing the program board 22.

Assume that the data processing unit 10 installed in the processing apparatus 1 accesses the program board 60a by way of example. To access the memory 22b of the program board 22, the data processing unit 10 needs the keys 70 and 71 for

opening the memory lock 62 and the file lock 63, respectively, as stated earlier. As shown in FIG. 7, the keys 70 and 71 may be implemented by any of three different schemes: obtaining key data from the central equipment 15 (FIG. 1) (on-line download S47), using data entered on the keyboard 2 (FIG. 1) by the operator as key data (operator's key input S48), and loading the memory or lockless memory 61 with key data beforehand so that it may be read out at need (reading key data from program board S49). The data processing section 10 obtained the key data transmits the key data to the program board 22.

In detail, the data processing unit 10 sends, among the key data, the key 70 to the program board 22 first (step S50). In response, the program board 22 determines whether or not the key 70 is right (S51). If the answer of the step S51 is YES, the program board 22 opens the memory lock 62 (S52) and returns an OK status to the data processing unit 10. Then, the program advances to a step S53. If the answer of the step S51 is NO, the program board 22 sends an NG status to the data processing unit 10, determining that an error has occurred. In the step S53, the data processing unit 10 determines whether or not the key 70 has been correctly processed by the program board 22. If the result of decision in the step S53 is YES, the data processing section 10 transmits the key 71 to the program board 22. This is followed by a step S54. If the result is NO, the data processing unit 10 determines that an error has occurred.

In the step S54, the program board 22 determines whether or not the key 71 is right. If the answer of the step S54 is YES, the program board 22 opens the file key 63 (S55) and sends an OK status to the data processing unit 10. If the answer is NO, the program board 22 sends an NG status to the data processing unit 10, determining that an error has occurred. The step S55 is followed by a step S56 in which the data processing unit 10 sees if the processing associated with the key 71 has been executed correctly. If it has been executed correctly, the data processing unit 10 accesses the file 60a of the memory 22b, i. e., it executes memory read/write processing (S57). Subsequently, the program advances to a step S58.

In the step S58, the data processing unit 10 determines whether or not the file access has ended. If the result of the step S58 is NO, the program returns to the step S57. If it is YES, the data processing section 10 sends an end command to the program board 22. The step S58 is followed by a step S59 for closing the memory lock 62 and file lock 63 of the program board 22. This ends the processing and inhibits further access to the memory 22b.

FIG. 8 shows a memory map representative of a specific construction of the memory 22b which is installed in the program board as shown in FIG. 5. As shown, the memory 22b stores IC card protocol data 30, a terminal number 31, a firm code 32, floor limit data 33, on-line dial number data 34, application programs 35 for the selection of transactions procedures, parameters 36 for communication control, etc. The IC card protocol data 30 is so-called format data representative of the kind of a format in which data are stored in an IC card. The terminal number 31 is an exclusive number assigned to the processing apparatus 1 by a card issuing firm so that the central equipment 15 may identify the processing apparatus or terminal 1 sending data in distinction from the others. The floor limit data is indicative of the upper limit of account available with a card. The on-line dial number data 34 shows a telephone number assigned to the central equipment 15. The application programs 35 are data representative of programs and data for executing various kinds of transactions. The communication control parameters 36 are data representative of various kinds of parameters necessary for the communication of the processing apparatus 1 with the central equipment 15.

FIG. 9 shows a specific format of an answer-to-reset signal which is sent from an IC card to the processing apparatus 1. Specifically, when an IC card is loaded in the card reader/writer 21 (FIG. 1), the data processing unit 10 sends a reset signal to the IC card and, in response, the IC card returns an answer-to-reset signal to the data processing section 10. The answer-to-reset signal is shown as having initial characters 40, format characters 41, interface characters 42, and historical characters as prescribed by ISO/DIS7816-3 ANNEX A, by way of example. The initial characters 40 indicate, in the event of interchange of data of the IC card with the data processing unit 10, which of the most significant bit (MSB) and least significant bit (LSB) heads the others, for example. The format characters 41 show a particular format in which the interface characters 42 are recorded. The interface characters 42, in turn, show the operating clock and operating voltage particular to the IC card. The historical characters 43 are representative of a spare item which is available for indicating extra data unique to the IC card, if any.

Specific operations of the card transactions processing apparatus 1 having the construction shown in FIG. 1 will be described with reference also made to FIGS. 10A, 10B and 10C, and by taking a credit transaction which is performed with an IC card having magnetic stripes thereon as an example.

The operations begin with a step S1 for turning on the power supply of the processing apparatus 1. Then, the processing apparatus 1 is initialized (S2)

by the following procedure. An authorized attendant loads the card reader/writer 21 with an exclusive card for initialization to cause it to read data stored in the card. Subsequently, the attendant enters on the keyboard 2 a predetermined code number which in principle is a number coincident with the terminal number 31 (FIG. 8). In response, the data processing unit 10 compares a number included in the initializing card data and read out by the card reader/writer 21 and the code number entered on the keyboard 2 and, if they are not coincident, the unit 10 inhibits the processing apparatus 1 from being operated. If the two numbers are coincident, the data processing unit 10 compares the code number entered on the keyboard 2 with the terminal number 31. If the two numbers compare equal, the data processing unit 10 executes the next step S3 while, if they do not compare equal, it inhibits the operation of the processing apparatus 1. By such a unique sequence of steps, persons other than the authorized attendant are inhibited from using the processing apparatus 1.

In the step S3, the data processing unit 10 determines whether or not the attendant has pressed a key "CREDIT" (FIG. 3) for performing a credit transaction. If the result of the step S3 is YES, the program advances to a step S4. When the attendant inserts an IC card in the card reader/writer 21, the data processing unit 10 reads magnetic stripes provided on the IC card via the card reader/writer 21 while writing the content in the RAM 12 (S4). This stripe reading step is executed mechanically, whether or not magnetic stripes are present on the IC card. When the IC card is loaded on the card reader/writer 21, data stored in the card are read out via the connecting terminal of the card. Then, whether or not the data read-out from the IC card has been completed is determined (S5). If the result of the S5 is YES, the program advances to a step S6 for reading data represented by an answer-to-reset signal which is fed back from the IC card. The data processing unit 10 checks the IC card mounted on the card reader/writer 21 to see if it is the protocol A of the program board 22-1 that is needed for the credit transaction processing (S7).

If the protocol A of the program board 22-1 is the necessary protocol as decided in the step S7, the data processing unit 10 selects the program board 22-1 and then loads the RAM 12 with the program particular to the program board 22-1 (S8). The processing apparatus 1 having executed the step S8 is ready to enter into an actual transaction processing.

To select a particular program board 22, the data processing unit 10 references data which are representative of the correspondence of protocols and positions on the processing apparatus 1 where program board 22 are mounted and are stored in the RAM 12 beforehand. Specifically, when a program board 22 is mounted on the processing apparatus 1, a function key 2c (FIG. 3) provided on the keyboard 2 is pressed and, thereafter, the numeral keys 2a are manipulated to enter a number representative of the mounting position of the program board 22 and a number representative of a protocol associated with the program board 22. In response to the operation of the function key 2c, the data processing unit 10 generates data which shows the correspondence of the protocol and the mounting position of the program board 22, the data being written in the RAM 12. The data processing unit 10 searches for the mounting position of a program board 22 associated with the determined protocol, and it delivers a program load command to that program board 22. Another possible approach for selecting a program board associated with a particular protocol is to load each program board 22 with data representative of a protocol. In this case, the data processing unit 10 will find the particular program board 22 by reading such data out of the program board 22.

The attendant manipulates the keyboard 2 to enter the proceeds from the transaction (S9) and then presses a key "RUN" (FIG. 3) (S10). In response, the data processing unit 10 performs a predetermined editing operation on the basis of the data read out of the IC card (e. g. member's number, valid term, firm code, etc.) and the data entered on the keyboard 2. Then, the data processing unit 10 controls the communication control unit 13 to transmit a telegraphic message to the central equipment 15 over the communication line 14. The central equipment 15 in turn executes predetermined processing with the received message and then transmits data inclusive of a result of decision as to the acceptability of the transaction to the processing apparatus 1 over the communication line 14. The communication between the terminal 1 and the center 15 ends when the former receives the message from the latter via the communication control unit 13 (S11). The data processing unit 10 drives the printer 4 on the basis of the message received from the central equipment 15, thereby printing out the proceeds data (S12). This completes the transaction using the IC card, or credit card, and ends the program.

If the result of the decision in the step S7 is NO, the data processing unit 10 executes a step S13 for determining whether or not the protocol B of the program board 22-2 is the necessary protocol for the transaction. If the answer of the step S13 is YES, a step S14 is executed to effect the same processing as the step S8 with the protocol B. Then, the proceeds is entered as in the step S9 (S15). Subsequently, the operation is transferred to

the step S10.

If the answer of the step S13 is NO, the data processing unit 10 determines whether or not the protocol C of the program board 22-3 is needed for the transaction (S16). If the result of decision in the step S16 is YES, the same processing as in the step S9 is executed with the protocol C (S17), the proceeds is entered as in the step S9 (S18), and the program advances to the step S10. If the answer of the step S16 is NO, the program executes a step S19 by determining that an error has occurred. This error shows, for example, that a particular protocol for holding a communication with the central equipment 15 cannot be determined. In the step S19, the data processing unit 10 executes error processing for restoring the processing apparatus 1 to its initial conditions, thereby ending the operation.

If the answer of the previously stated step S5 is NO, the data processing unit 10 runs a step S20. Specifically, the data processing unit 10 checks the RAM 12 to see if data representative of magnetic stripes of the IC card exist therein. If the answer is NO, meaning that no such data is present in the RAM 12, the program advances to the error processing step S19 and then ends the operation. This error shows that data essential for the transaction is not obtainable from the IC card. If the result of decision in the step S20 is YES, the data processing unit 10 effects a step S21 for selecting a program board and loading the RAM 12 with a program being stored in the program board, as in the step S8. On the entry of the proceeds (S22), the program advances to the step S10.

If the result of the decision in the step S3 is NO, the data processing unit 10 executes a step S23 to see if a key "CHECK" (FIG. 3) on the keyboard 2 has been pressed. If the answer is YES, processing associated with a check is executed (S24) and followed by the step S10. If the answer of the step S23 is NO, a step S25 is executed to determine whether or not a key "DEBIT" (FIG. 3) on the keyboard 2 has been pressed. If the answer is YES, the data processing unit 10 effects a step S26 which is essentially similar to the step S4 and then executes a step S27 which is essentially similar to the step S5. If the answer of the step S27 is YES, processing associated with a debit is executed (S28) and followed by the step S10 while, if it is NO, a step S29 which is essentially similar to the step S20 is executed. If the answer of the step S29 is YES, the program advances to a step S30 and then to the step S10. If the answer of the step S29 is NO, the data processing unit 20 executes the error processing step S19. This error, like the error described in relation to the step S20, shows that card data indispensable for the transaction is not obtainable. In the step S19, the data processing unit 10 runs the error processing and then ends the operation.

It is to be noted that the steps S4 and S26 for reading magnetic stripes on a card is effected mechanically with no regard to the presence/absence of such stripes, and the RAM 12 (Fig. 1) is loaded with predetermined data only if magnetic stripes are present.

As shown and described, the card transactions processing apparatus 1 executes transaction processing associated with an IC card, on the basis of a transaction program and data stored in the program board 22. The program board 22 may be removed from the processing apparatus 1 so as to inhibit the processing with cards which are associated with the program board 22.

While the illustrative embodiment has been shown and described in relation to an IC card having magnetic stripes thereon, the present invention is of course practicable with an IC card without magnetic stripes and a magnetic stripe card. The items of transactions available with the present invention are not limited to the credit, debit and check to which the illustrative embodiment pertain, and they may additionally include bonus settlement, installment plan, revolving, etc. This can be done simply by modifying the program boards 22 or using alternative program boards.

The control section 22a and memory 22b of the program board 22 may be implemented as a one-chip configuration of silicon, for example, in place of the independent arrangement shown in FIG. 5. Furthermore, the memory 22b may be constituted by an EEPROM (Electrically Erasable Programmable Read Only Memory) so as to allow the transactions programs and data to be changed without resorting to the replacement of the program board 22.

In summary, it will be seen that the present invention provides a card transactions processing apparatus in which a particular transaction processing program and data necessary for a transaction are specified by a program which is transferred from a program board to a RAM, eliminating the need for various kinds of transactions procedures otherwise stored in ROMs, RAMs and IC cards. Therefore, ROMs and RAMs each having a small capacity suffice many kinds of transactions, cutting down the memory cost and thereby the cost of the card transactions processing apparatus as a whole. The apparatus of the invention can readily adapt itself to the diversification of the kinds of IC cards and magnetic stripe cards, only if it is furnished with additional program boards or if the program boards are modified. In addition, the program boards are simply mated with a data processing section of the apparatus by connectors and, therefore, they are easy to mount and dismount.

While the present invention has been described with reference to the particular illustrative embodiment, it is not to be restricted by the embodiment but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiment without departing from the scope and spirit of the present invention.

Claims

1. A card transactions processing apparatus for executing, when a card storing data is mounted on said apparatus, predetermined processing by using card data being stored in said card,
CHARACTERIZED IN THAT
said card transactions processing apparatus comprises:
a card reader/writer (21) for selectively reading the card data out of the card and writing data in said card;
data processing means (10) for executing predetermined processing on the basis of the card data; and
program board mounting means (72) for removably mounting a program board (22) which stores a processing program particular to a party associated with the card.

2. An apparatus in accordance with claim 1,
CHARACTERIZED IN THAT
said program board mounting means (72) is selectively loaded with a plurality of the program boards (22) each storing a different processing program.

3. An apparatus in accordance with claim 1,
CHARACTERIZED IN THAT
when a transaction processing request is entered with the card, said data processing means (10) selects the program board (22) storing the particular processing program associated with said card, and executes transaction processing on the basis of a transaction program or data being stored in said selected program board (22).

4. An apparatus in accordance with one of claims 1 to 3,
CHARACTERIZED IN THAT
said card reader/writer (21) comprises an IC card section (21a) for reading and writing data in an IC card, and a magnetic stripe card section (21b) for reading magnetic stripes which are provided on a magnetic card.

5. An apparatus in accordance with one of claims 1 to 4,
CHARACTERIZED IN THAT
when an IC card is mounted on said card reader/writer (21), said data processing means (10) sends a reset signal to said IC card while said IC cards returns an answer-to-reset signal to said data processing means (10) in response to the reset signal;
the answer-to-reset signal comprising:
first characters (40) indicative of which of a most significant bit and a least significant bit is the first;
second characters (42) representative of an operating clock and an operating voltage of the IC card; and
third characters (41) representative of a format in which the second characters (42) are recorded.

6. A card transactions processing apparatus for executing, when a card storing data is mounted on said apparatus, predetermined processing by using card data being stored in said card,
CHARACTERIZED IN THAT
said card transactions processing apparatus comprises:
a card reader/writer (21) for selectively reading the card data out of the card and writing data in said card;
data processing means (10) for executing predetermined processing on the basis of the card data; and
program board means (72, 22) on which at least one program board (22) storing a processing program particular to a party may be mounted.

7. An apparatus in accordance with claim 6,
CHARACTERIZED IN THAT
the program board (22) is removably mounted on said program board means (72, 22), and said program board means (72, 22) is operable with additional program boards (22).

8. An apparatus in accordance with claim 6,
CHARACTERIZED IN THAT
when a transaction processing request is entered wih the card, said data processing means (10) selects the program board (22) associated with said card by said program board means (72, 22), and executes transaction processing on the basis of a transaction program or data being stored in said selected program board (22).

9. An apparatus in accordance with one of claims 6 to 8,
CHARACTERIZED IN THAT
said card reader/writer (21) comprises an IC card section (21a) for reading and writing data in an IC card, and a magnetic stripe card section (21b) for reading magnetic stripes which are provided on a magnetic card.

10. An apparatus in accordance with one of claims 6 to 9,
CHARACTERIZED IN THAT
when an IC card is mounted on said card reader/writer (21), said data processing means (10) sends a reset signal to said IC card while said IC cards returns an answer-to-reset signal to said data processing means (10) in response to the reset signal;

the answer-to-reset signal comprising:
first characters (40) indicative of which of a most significant bit and a least significant bit is the first;
second characters (42) representative of an operating clock and an operating voltage of the IC card; and
third characters (41) representative of a format in which the second characters (42) are recorded.

11. A program board for use with a card transactions processing apparatus which executes, when a card storing data is mounted on said apparatus, predetermined processing by using card data being stored in said card,
CHARACTERIZED IN THAT
said program board comprises:
connecting means (23) for connecting to a card transactions processing apparatus which executes transaction processing by using card data being stored in a card;
storing means (22b) loaded with a transaction program and data; and
control means (22a) for controlling an interchange of data of said program board with the card transactions processing apparatus on the basis of the transaction program and data being stored in said storing means (22b).

12. A program board in accordance with claim 11,
CHARACTERIZED IN THAT
said storing means (22b) comprises a first and a second storing section in the form of a memory with a lock and a memory without a lock, respectively.

13. A program board in accordance with claim 11 or 12,
CHARACTERIZED IN THAT
said storing means (22b) stores:
IC card protocol data (30) representative of a format in which data are stored in the card;
a terminal number (31) comprising a particular number for identifying the card transactions processing apparatus;
a firm code (32) comprising a number representative of a firm issuing the card;
floor limit data (33) representative of an upper limit of account available with the card;
on-line dial number data (34) representative of an access number for connecting the card to central equipment;
a transaction procedure selecting application program (35) comprising a program and data for executing transaction processing; and
parameters (36) for communication control representative of parameters which are necessary for the transactions processing apparatus to hold a communication with the central equipment.

14. Method for executing card transactions by a card transactions processing apparatus according to one of claims 1 to 10.

15. Method for executing card transactions by a program board for use with a card transactions processing apparatus according to one of claims 11 to 13.

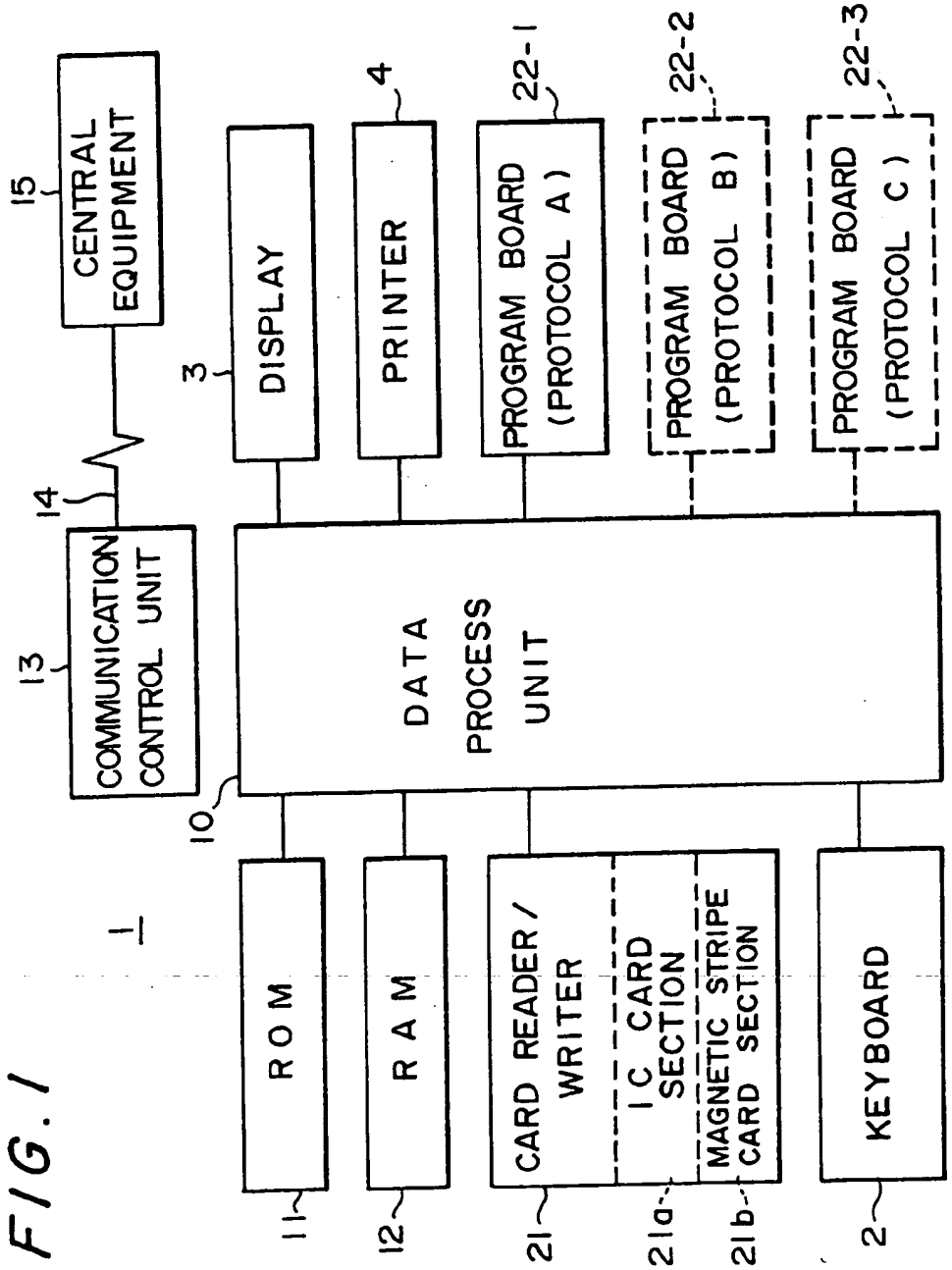

1
CENTRAL EQUIPMENT
15
14
COMMUNICATION CONTROL UNIT
13
10
DISPLAY
3
PRINTER
4
PROGRAM BOARD (PROTOCOL A)
22-1
PROGRAM BOARD (PROTOCOL B)
22-2
PROGRAM BOARD (PROTOCOL C)
22-3
DATA PROCESS UNIT
ROM
11
RAM
12
CARD READER / WRITER
21
IC CARD SECTION
21a
MAGNETIC STRIPE CARD SECTION
21b
KEYBOARD
2

FIG. 1

FIG. 2

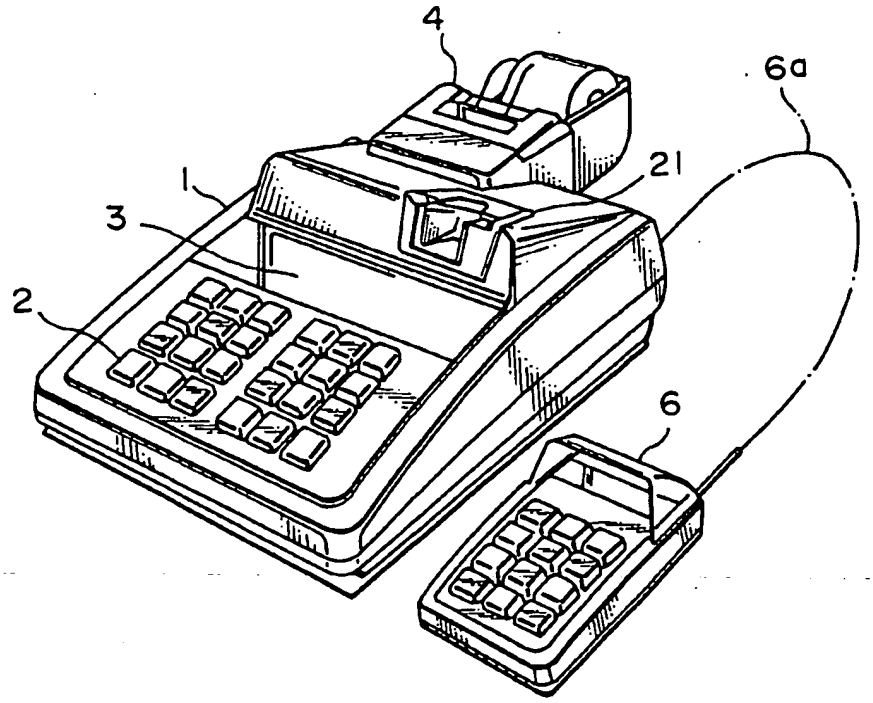
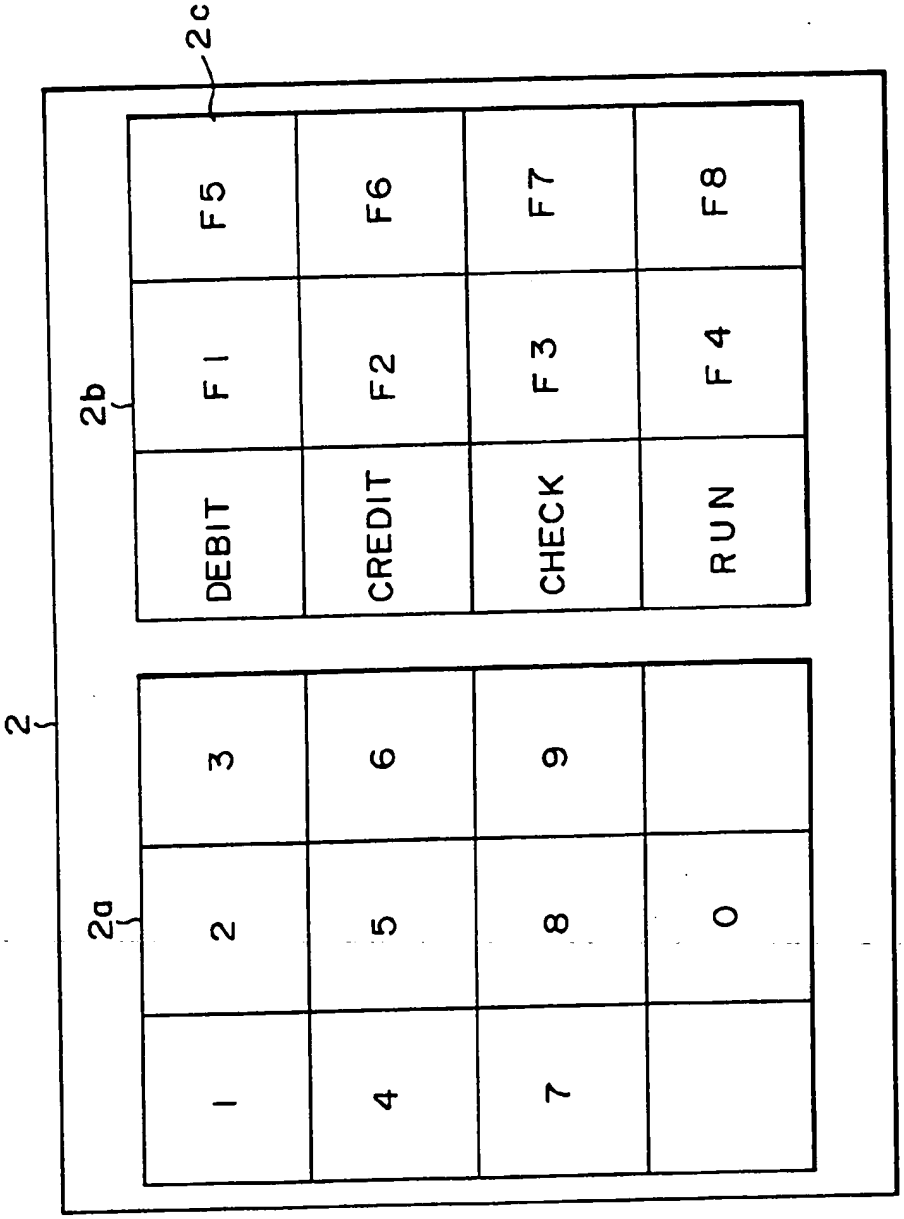


FIG. 3


2c
F5
F6
F7
F8
2b
F1
F2
F3
F4
DEBIT
CREDIT
CHECK
RUN
2
3
6
9
2a
2
5
8
0
1
4
7

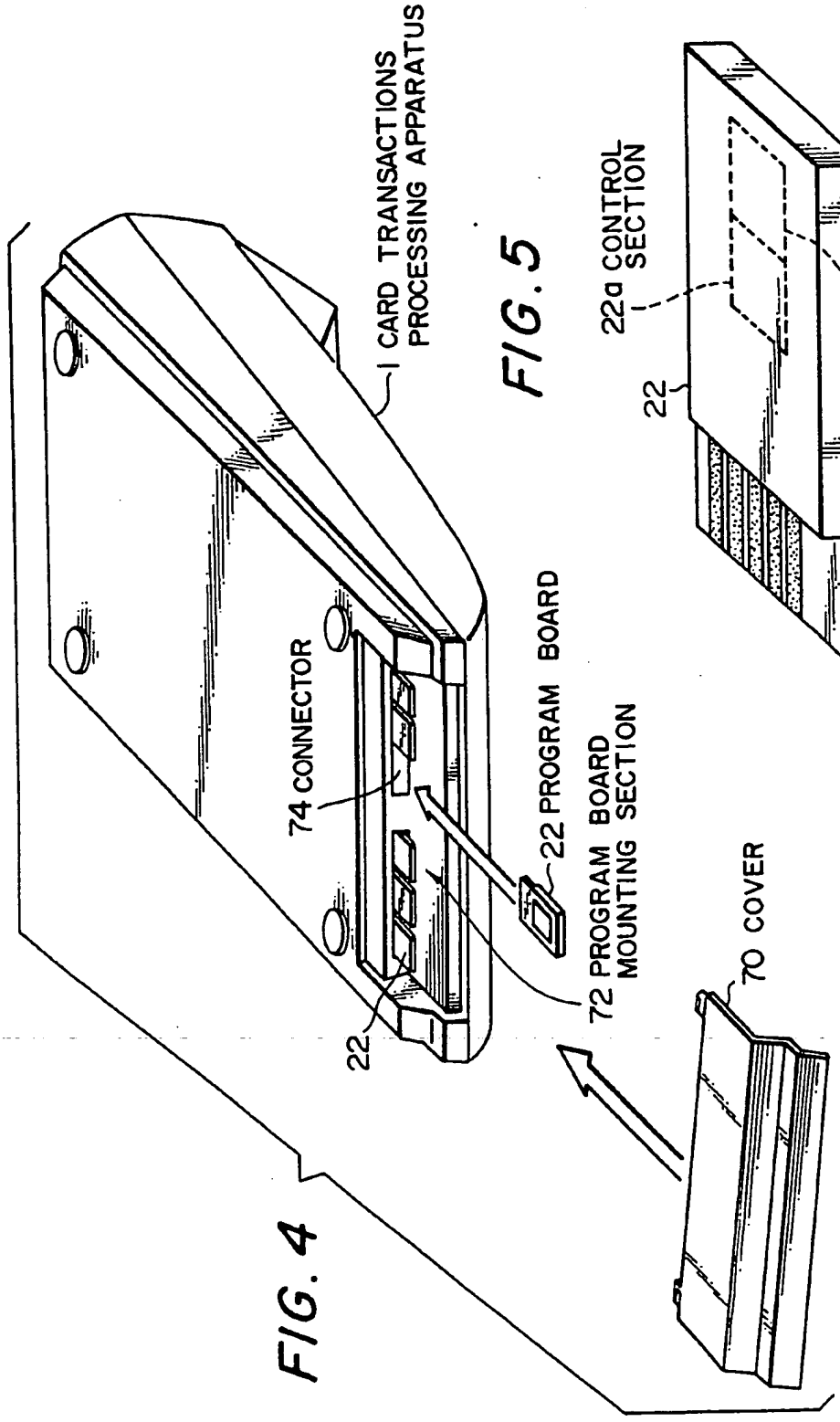

1 CARD TRANSACTIONS PROCESSING APPARATUS
74 CONNECTOR
22 PROGRAM BOARD
72 PROGRAM BOARD MOUNTING SECTION
70 COVER
22
22a CONTROL SECTION
22b MEMORY
22
23

FIG. 4

FIG. 5

FIG. 6

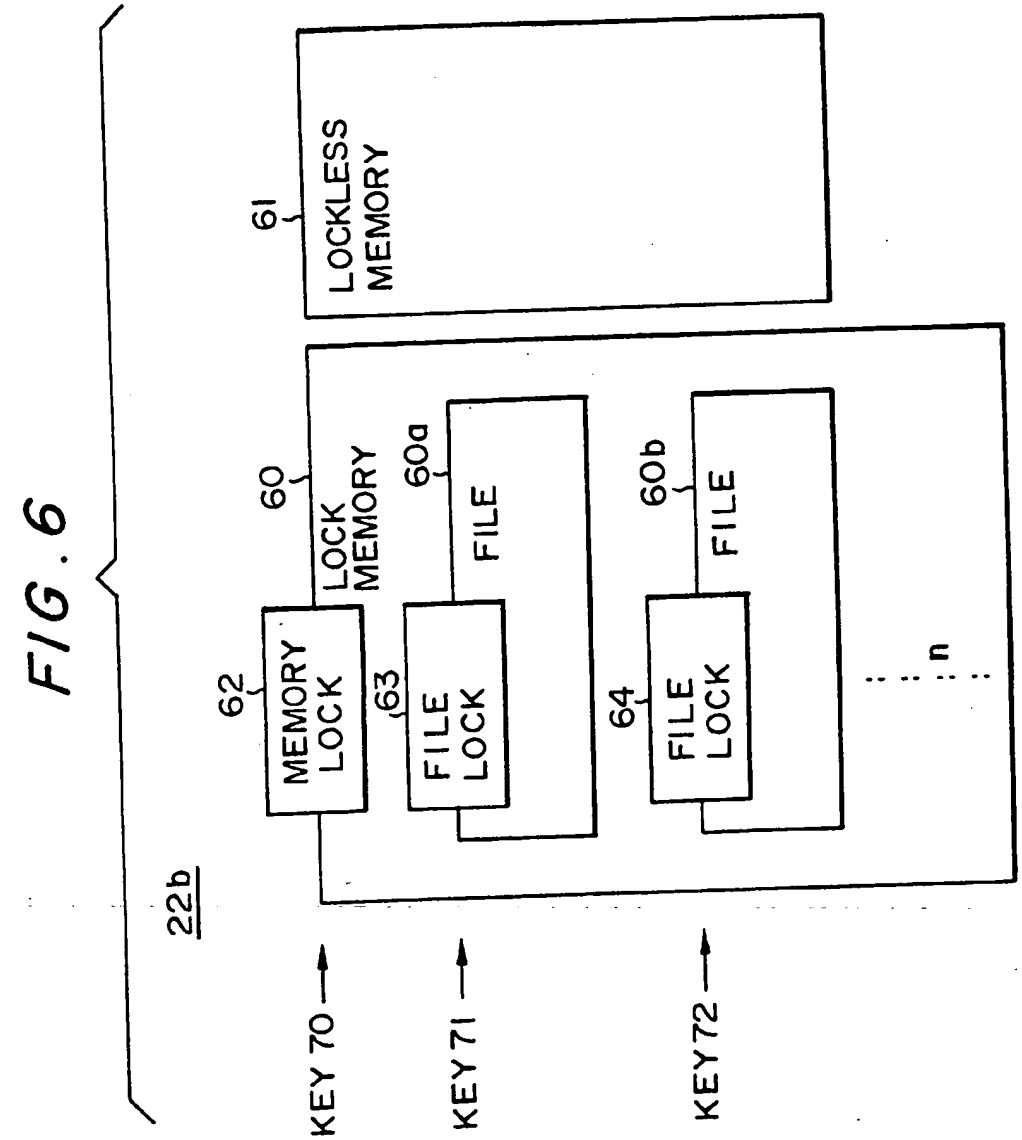

22b
61
LOCKLESS MEMORY
60
LOCK MEMORY
60a
FILE
60b
FILE
62
MEMORY LOCK
63
FILE LOCK
64
FILE LOCK
n
KEY 70
KEY 71
KEY 72

FIG.7

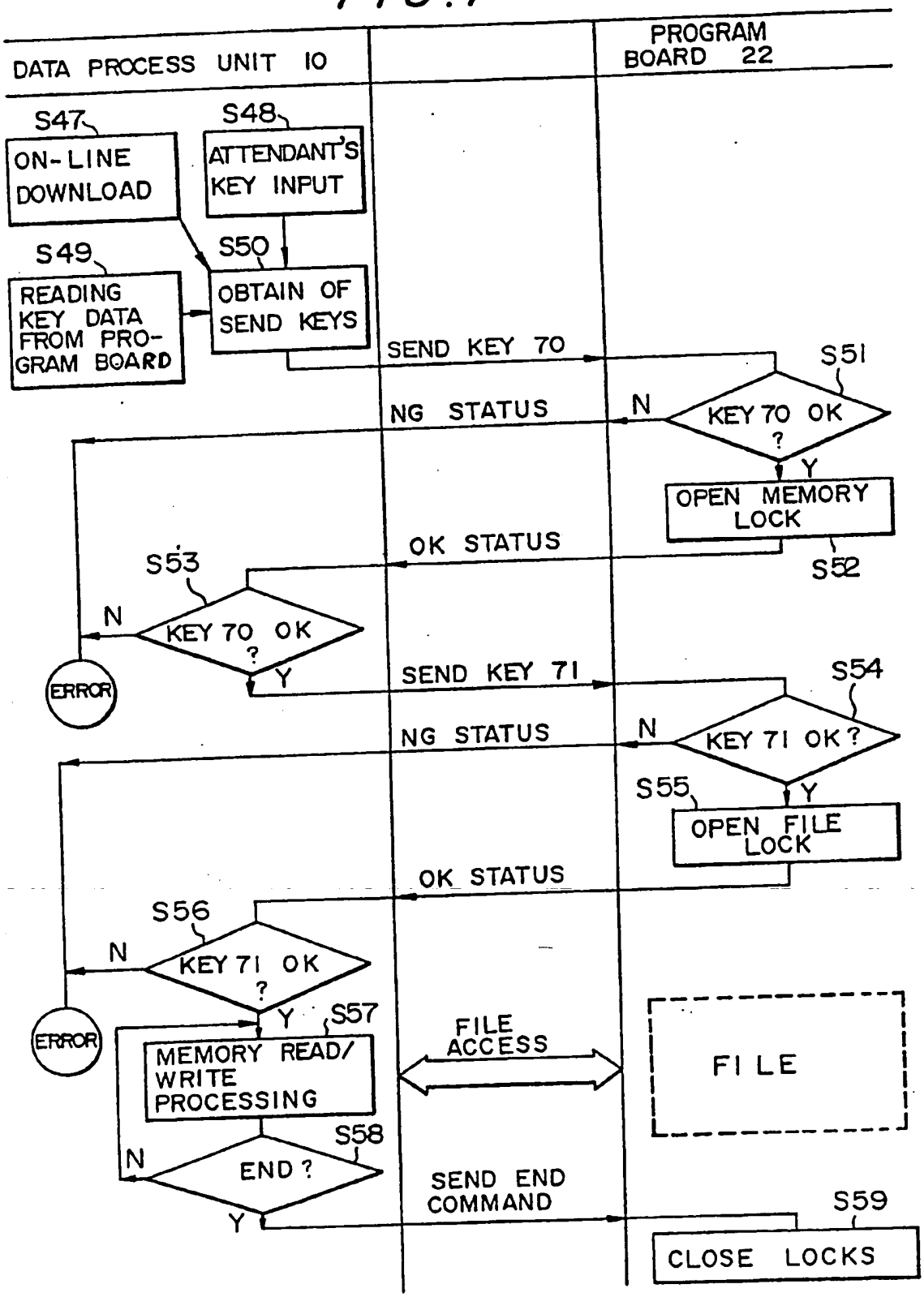

DATA PROCESS UNIT 10
PROGRAM BOARD 22
S47
ON-LINE DOWNLOAD
S48
ATTENDANT'S KEY INPUT
S49
READING KEY DATA FROM PROGRAM BOARD
S50
OBTAIN OF SEND KEYS
SEND KEY 70
S51
KEY 70 OK ?
N
Y
NG STATUS
OPEN MEMORY LOCK
S52
OK STATUS
S53
KEY 70 OK ?
N
Y
ERROR
SEND KEY 71
S54
KEY 71 OK?
N
Y
NG STATUS
S55
OPEN FILE LOCK
OK STATUS
S56
KEY 71 OK ?
N
Y
ERROR
S57
MEMORY READ/ WRITE PROCESSING
FILE ACCESS
FILE
S58
END ?
N
Y
SEND END COMMAND
S59
CLOSE LOCKS

FIG. 8

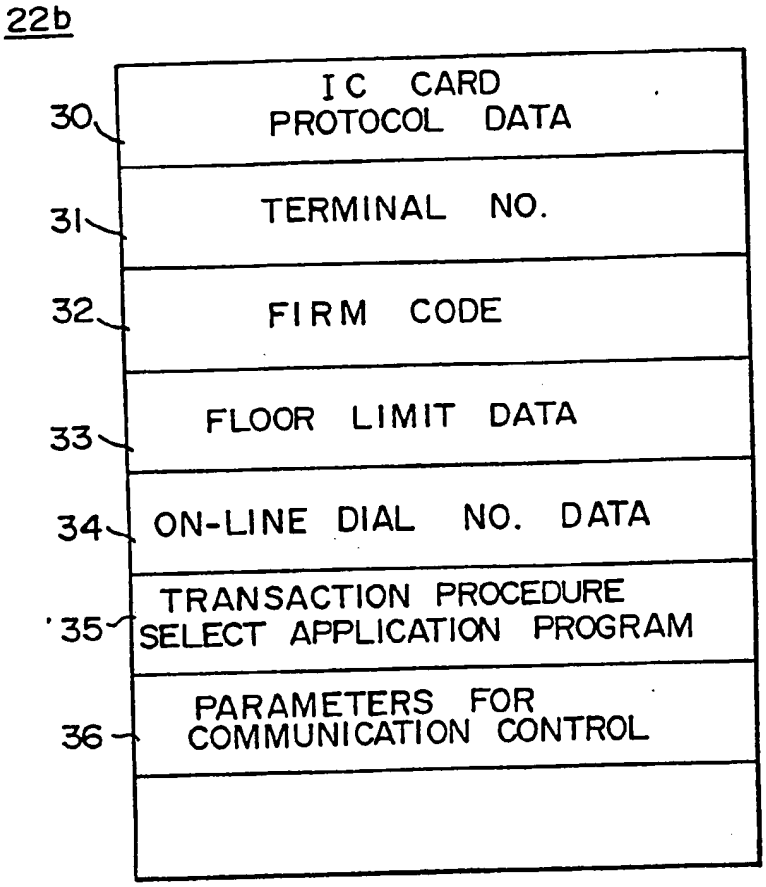

22b
30
IC CARD PROTOCOL DATA
31
TERMINAL NO.
32
FIRM CODE
33
FLOOR LIMIT DATA
34
ON-LINE DIAL NO. DATA
35
TRANSACTION PROCEDURE SELECT APPLICATION PROGRAM
36
PARAMETERS FOR COMMUNICATION CONTROL

FIG. 9

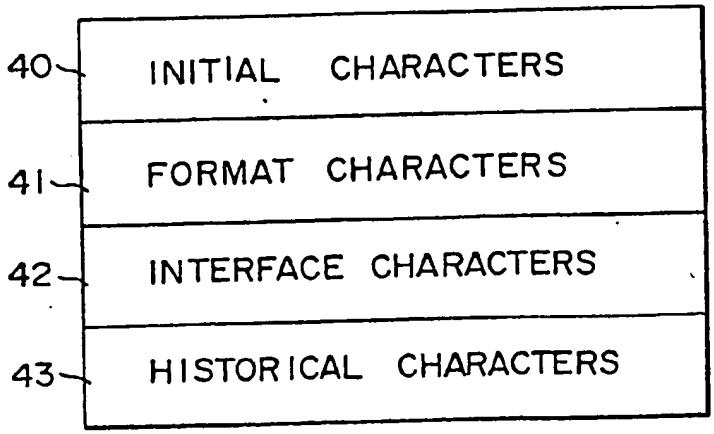

40
INITIAL CHARACTERS
41
FORMAT CHARACTERS
42
INTERFACE CHARACTERS
43
HISTORICAL CHARACTERS

FIG. 10A

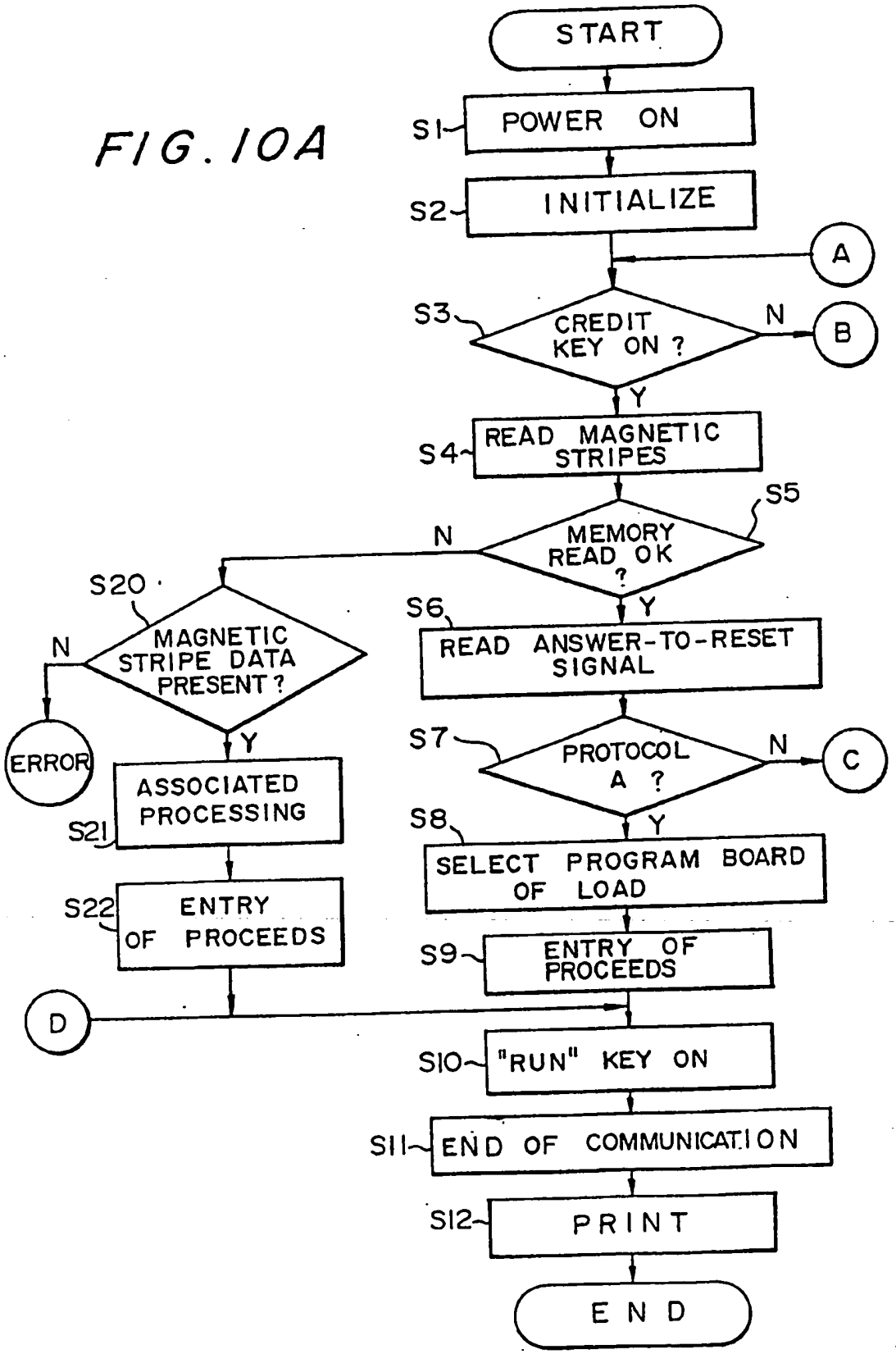

START
S1
POWER ON
S2
INITIALIZE
A
S3
CREDIT KEY ON ?
N
B
Y
S4
READ MAGNETIC STRIPES
S5
MEMORY READ OK ?
N
Y
S20
MAGNETIC STRIPE DATA PRESENT ?
N
Y
ERROR
S21
ASSOCIATED PROCESSING
S22
ENTRY OF PROCEEDS
D
S6
READ ANSWER-TO-RESET SIGNAL
S7
PROTOCOL A ?
N
C
Y
S8
SELECT PROGRAM BOARD OF LOAD
S9
ENTRY OF PROCEEDS
S10
"RUN" KEY ON
S11
END OF COMMUNICATION
S12
PRINT
END

FIG. 10B

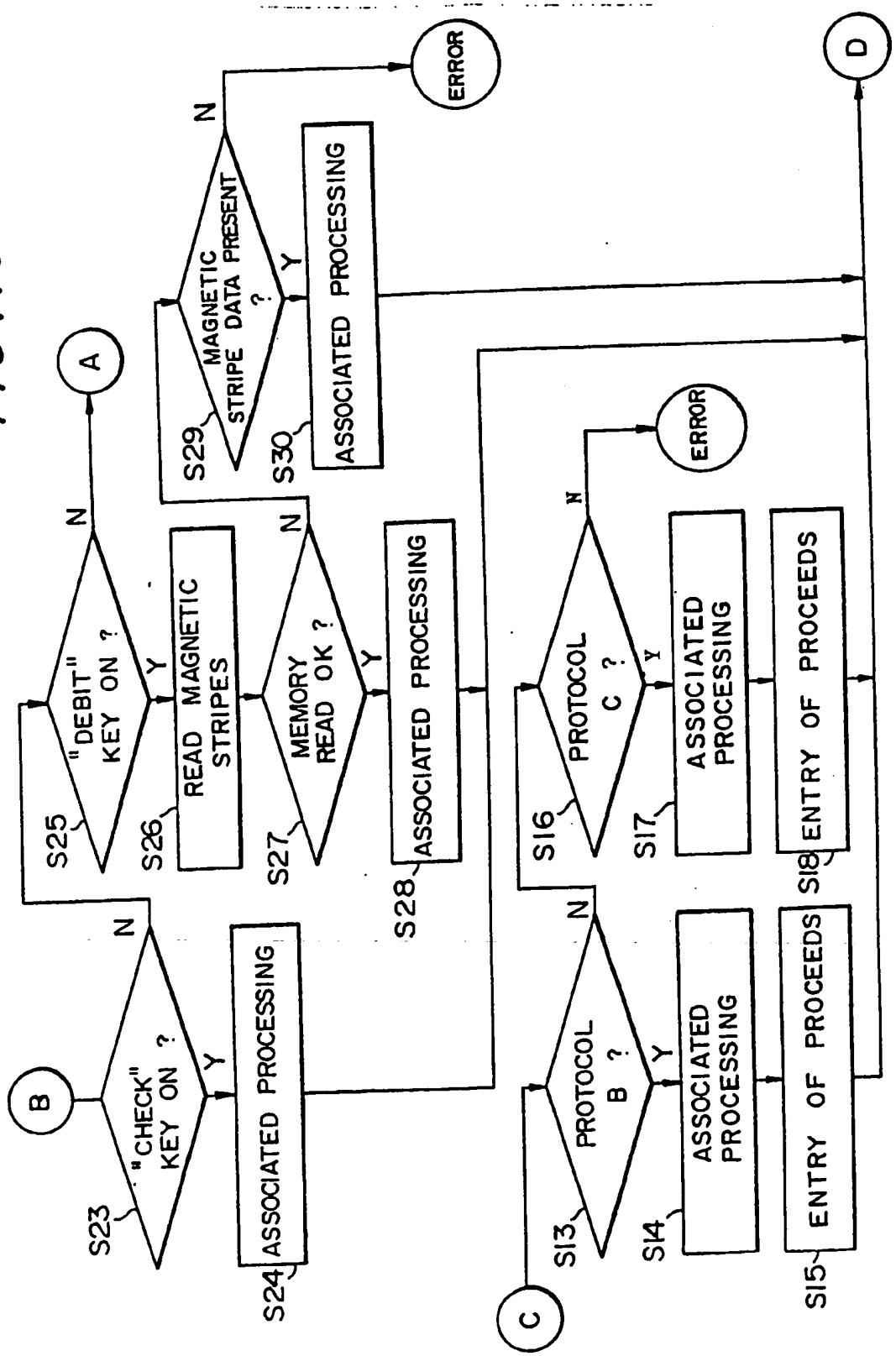

A
B
C
D
ERROR
ERROR
S13
PROTOCOL B ?
Y
N
S14
ASSOCIATED PROCESSING
S15
ENTRY OF PROCEEDS
S16
PROTOCOL C ?
Y
N
S17
ASSOCIATED PROCESSING
S18
ENTRY OF PROCEEDS
S23
"CHECK" KEY ON ?
Y
N
S24
ASSOCIATED PROCESSING
S25
"DEBIT" KEY ON ?
Y
N
S26
READ MAGNETIC STRIPES
S27
MEMORY READ OK ?
Y
N
S28
ASSOCIATED PROCESSING
S29
MAGNETIC STRIPE DATA PRESENT ?
Y
N
S30
ASSOCIATED PROCESSING

FIG. 10C